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The compensation problem with fresh starts

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Abstract

Forgiveness is an ethical ideal that advocates that a fresh start should be conferred on those individuals who regret their past choices. Grounded on such a principle, Fleurbaey (2005) proposes the use of the equivalent endowment as the proper measure of the welfare loss experienced by those who have mismanaged their initial resources. In this paper we provide the forgiveness framework with an ethical foundation that allows us to formally deal with the compensation problem. We obtain that different solutions to the ideal of forgiveness can arise according to the distributional requirements that society wants to satisfy.

Keywords: forgiveness, fairness, responsibility.

JEL Classification: D63, I31

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1 Introduction

Forgiveness is a fairness principle that defends that a fresh start should be given to those individuals who have changed their preferences and regret their past choices. Whether individuals should or should not be deemed responsible for changes in their preferences has become a debated subject among economists and philosophers.[1] Although many accept that there is no moral argument to force individuals to bear forever the consequences of their choices, a recurrent argument against the principle of forgiveness is that rewarding individuals who claim to regret their choices may generate a perverse incentive (see Dworkin 2002). Therefore, some authors ascribe full responsibility for past decisions to individuals. Fleurbaey (2005) challenges this viewpoint by proposing an *ex ante* incentive-compatible scheme of subsidies and taxes that does not necessarily reduce freedom, provided that there is no additional externality other than the taxes collected to finance fresh starts. Therefore, it is workable to design a policy that would allow individuals who reject their former life to start over by means of social aid.[2]

A graphical representation of the forgiveness ideal is given in Figure 1a. Let us assume that there are three individuals i, j, and k who have the same initial endowment, $w_1 > 0$, that has to be allocated between present (x_1) and future consumption (x_2). Let us consider that the price in both periods is equal to 1, and that the individuals' *ex ante* choices are z_i, z_j, and z_k respectively. The issue of forgiveness arises, for instance, when individual k chooses her bundle with the preferences of agent j (dashed indifference curves), but *ex post* she realises that her true preferences are those of individual i (solid curves). This implies a positive utility loss for individual k, loss that can be measured by means of the *equivalent endowment*. Such an endowment is the smallest amount of resources which are needed to obtain a bundle that, according to her true preferences, yields the same level of utility than her initial choice. In our example, the smallest equivalent endowment is equal to w_3, which is clearly lower than the initial endowment. Fleurbaey (2005) proposes that a society which is concerned about the forgiveness principle should make the smallest equivalent endowment within the population as large as possible. Notice that this interpretation of the concept of forgiveness assumes that people's current situations must be eval-

[1] E.g., Dworkin (2000, 2002), Arneson (1989), and Fleurbaey (1995, 2002, 2008).

[2] Actually, the implementation of the forgiveness ideal to real-life situations is not infrequent, as we can observe when a society tries to help those people who want to go back to school, or when a public health service treats all individuals who are in a bad health condition regardless of their previous lifestyle.

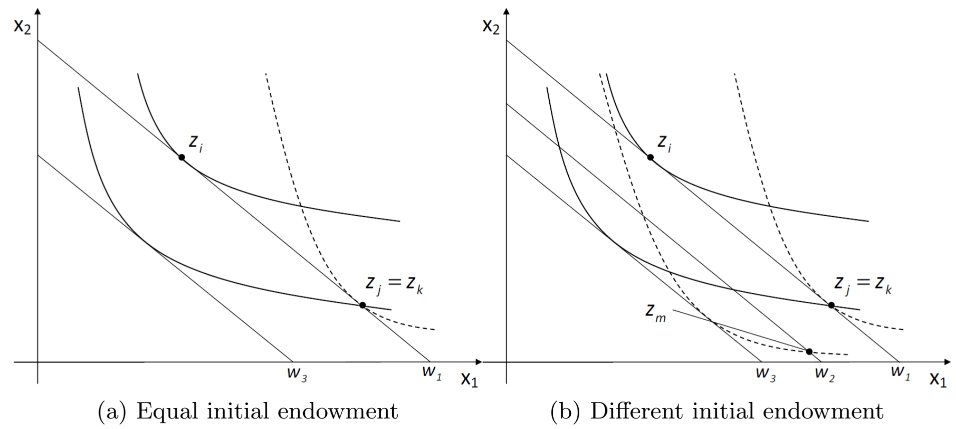


Figure 1: The principle of forgiveness

uated only with their final preferences over their whole lifespan, and hence the viewpoint of the initial preferences would be totally discarded from the analysis.

Interestingly enough, all models dealing with forgiveness include neither an axiomatic justification of the use of the equivalent endowment,[3] nor any additional source of unfairness other than the concern for those individuals who change their preferences. For instance, the analysis can be complemented with an additional agent m who both regrets her previous choice and has a smaller endowment (see Figure 1b). Our aim in this paper will be to explore these two missing aspects from the literature.

At the time of introducing the issue of fairness and responsibility in the forgiveness model, we should be aware of the fact that there are two mainstream ways of treating the compensation problem. On the one hand, the so-called *principle of compensation* states that differences not due to responsibility should be eliminated. On the other hand, the so-called *principle of reward* says that inequalities due to responsibility should be left untouched. It has been extensively proved that these two principles clash with each other.[4] An intuitive way of escaping from such an incompatibility consists of focusing on the principle of compensation and next fulfilling the principle

[3]Fleurbaey (2005), p.43: "Admittedly, the arguments given here fail to provide a full case for this particular way of assessing individual situations. A full justification would involve an axiomatic derivation of this measure from basic ethical principles".

[4]See Fleurbaey (2008) for both a survey of the fairness literature, and an extensive discussion of that technical incompatibility.

of reward to the greatest possible extent. We shall endorse that approach here.

An additional aspect of the fairness literature that one should be concerned with is that axioms that aim to reduce resource inequality should be carefully designed to make them compatible with basic concepts of efficiency. This issue has also been extensively discussed in the literature (e.g., Fleurbaey et al. 2009). The plausible way out for this new dilemma, that we shall also endorse is to weaken standard fairness requirements in order to manage the incompatibility with efficiency. Eventually, this will lead us to single out social orderings that are based on the comparisons with respect to reference bundles, as previously did Fleurbaey and Maniquet (2011), among others.

In this paper we explore in detail the incompatibility that arises when trying to directly complement standard models of fairness with the inclusion of fresh starts. We derive a social ordering that is in line with the traditional solution to the compensation problem. We show that such an ordering is not compatible with Fleurbaey's (2005) solution to the forgiveness problem. Next, we adapt the fairness requirements to deal with the forgiveness ideal. Based on the existence of a fixed reference price, we prove that the concept of equivalent endowment can indeed be obtained as the solution of a formal model of forgiveness in which the principle of compensation is prioritised. Finally, we also relate our results to those that have been previously proposed for specific environments.

The paper is organised as follows. Section 2 introduces the basic components of the model and the ethical requirements that we endorse for this setting. In Section 3 we describe the existing incompatibilities between redistribution and efficiency axioms, and we present the social rules that result from different concepts of fairness. Next, we characterise the features that lead us to focus on the minimum equivalent endowment as the optimal social ordering. Finally, we sketch the model that Fleurbaey (2005) proposes to implement the fresh start ideal in a real-life scenario. Section 4 reviews the conclusions of this study. All the proofs are relegated to an Appendix.

2 The framework and the ethical principles

Let us consider an economy that consists of a finite set of individuals $N = \{1, \ldots, n\}$. Each agent $i \in N$ has an initial endowment $w_i \in \mathcal{W} = \mathbb{R}_{++}$ that she can devote to both consumption in period 1 ($x_{i1} \in \mathbb{R}_+$) and consumption in period 2 ($x_{i2} \in \mathbb{R}_+$). Let $W = (w_1, \ldots, w_n)$ be the profile of preferences in society. The price of intertemporal consumption is given by the vector $q = (q_1, q_2) \in \mathcal{Q} = \mathbb{R}^2_{++}$.[5] Individual i's *bundle* is a consumption vector $z_i = (x_{i1}, x_{i2}) \in Z$, where $Z = \mathbb{R}^2_+$ is the set of all the possible bundles. An *allocation* defines all individuals' bundles, $z = (z_1, \ldots, z_i, \ldots, z_n) \in Z^n$.

Every agent $i \in N$ has well-defined preferences R_i over the space Z, which are described by a complete preorder, that is to say, a binary relation that is reflexive, transitive, and complete. The preferences, apart from being a complete preorder, must also be continuous, strictly convex, and strictly monotonic. Let $\mathcal{R}$ denote the set of such preferences. $z_i \succsim_i z'_i$ means that individual i weakly prefers bundle z_i to bundle z'_i. Strict preference and indifference are denoted by $\succ_i$ and $\sim_i$ respectively.

Additionally, we say that preferences $R_j \in \mathcal{R}$ present a higher level of prudence than $R_k \in \mathcal{R}$ (that we denote as $R_j \succ_{Pr} R_k$), if for any $z_j, z_k \in Z$ the following relations hold:

$$\begin{cases} x_{k1} > x_{j1} \text{ and } z_j \sim_k z_k \Rightarrow z_j \succ_j z_k \\ x_{k1} < x_{j1} \text{ and } z_j \sim_j z_k \Rightarrow z_j \succ_k z_k. \end{cases}$$

In words, we assume that individual preferences satisfy the *single-crossing property*; that is to say, any two indifference curves of two different preferences cross no more than once.

Let $R = (R_1, \ldots, R_n) \in \mathcal{D}$ be the profile of preferences in society. In order to model the forgiveness principle we assume that agents make their choices according to some *ex ante* preferences $R^a \in \mathcal{D}$, although they get their final utility from an *ex post* set $R^p \in \mathcal{D}$ that may or may not coincide with the *ex ante* preferences.

An economy is denoted by $e = (W, q, R) \in \mathcal{E}$, where $\mathcal{E}$ is the domain of all the economies satisfying the above assumptions. In order to compare allocations we have to define a social ordering $\mathbf{R}(e)$ over all allocations, where $z\mathbf{R}(e)z'$ means that allocation z is at least as good as z'. Strict preference would be established as $z\mathbf{P}(e)z'$. Let us consider that social preferences are described by a complete preorder.

Taking the *ex post* profile as the reference set, we define the individual's *equivalent endowment* as the smallest amount of resources that would allow her to buy a bundle that is equivalent, in terms of preferences, to her initial choice.

[5]Vector inequalities are denoted $\geq, >, \gg$.

Definition 1 *For all $i \in N$, $R_i^p \in \mathcal{R}$, $z_i \in Z$ and a given price $q \in \mathcal{Q}$, we define the individual i's equivalent endowment $\widehat{w}(z_i, q)$ as:*

$$\widehat{w}(x_i, q) = min\{w \in \mathbb{R}_{++} : \exists\ z_i' \in X \ with \ z_i' \succsim_i^p z_i \ and \ qz_i' \leq w\}.$$

We introduce now a definition that assesses whether or not an individual is maximising her *ex post* preferences. If the individual i's budget constraint is defined as the set of all the bundles that she can afford with income w if prices are q, $B_i(w, q) = \{z_i \in Z : qz_i \leq w\}$, we have that:

Definition 2 *For all $i \in N, R_i^p \in \mathcal{R}$ and a given price $q \in \mathcal{Q}$, we define $\overline{Z}_i(\overline{w}, q) \subset Z$ as the set of all the bundles that maximise individual i's ex post preferences, given price q:*

$$\overline{Z}_i(\overline{w}, q) = \{z_i \in Z : qz_i = w \leq \overline{w} \ and \ z_i \in \max |_{R_i^p} B_i(w, q)\},$$

where $\overline{w} = \sum_{i=1}^n w_i$.

Notice that such a definition is not indexed to any particular endowment, and hence subset $\overline{Z}_i(\overline{w}, q)$ consists of the line that connects all the individual's *ex post* optimal bundles, given price $q \in \mathcal{Q}$, for all the possible levels of wealth that are smaller than or equal to the overall endowment $\overline{w}$.

Interestingly enough, for any agent $i \in N$ there always exists a bundle $\overline{z}_i(\lambda_i\overline{w}, q) \in \overline{Z}_i(\overline{w}, q)$ that provides such an individual with the same level of utility than her current choice $z_i \in Z$. In fact, we can identify individual i's actual bundle with the fraction of the overall wealth that she should need to buy such a bundle $\overline{z}_i(\lambda_i\overline{w}, q)$. More precisely:

Definition 3 *For all $i \in N, R_i^p \in \mathcal{R}$ and a given price $q \in \mathcal{Q}$, we define individual i's proportional-income as the scalar $\lambda_i \in [0, 1]$ that makes that the following relation is satisfied:*

$$\overline{z}_i(\lambda_i\overline{w}, q) \in \max |_{R_i^p} B_i(\lambda_i\overline{w}, q) \quad with \quad z_i \sim_i^p \overline{z}_i(\lambda_i\overline{w}, q).$$

Finally, if we define the subset $Pr(a) \subset Z$ as the set of bundles which are proportional to a given bundle $a \in \mathbb{R}^2_{++}$, we can also introduce the concept of *proportional-equivalent bundle* as follows:

Definition 4 *For all $i \in N, R_i^p \in \mathcal{R}$, and $z_i \in Z$, we define individual i's proportional-equivalent bundle as the bundle $\widehat{z}_i(a) \in Pr(a) \subset Z$ such that $\widehat{z}_i(a) \sim_i^p z_i$.*

At this point we introduce the ethical principles that we endorse for our social orderings. The first one is the definition of forgiveness.

Axiom 1 *(Forgiveness): An economy satisfies the principle of forgiveness if the social ordering is defined using the individuals' ex post preferences, that is* $R = R^p$.

Next, we impose a standard requirement of efficiency.

Axiom 2 *(Weak Pareto): For all* $e \in \mathcal{E}$ *and* $z, z' \in Z^n$, *if* $z_i \succ_i^p z_i'$ *for all* $i \in N$, *then* $z\boldsymbol{P}(e)z'$.

The following principle is a robustness property that permits us to compare two different allocations by using a subgroup of individuals, provided that the rest of the population have the same bundle in both allocations (see d'Aspremont and Gevers 1977).

Axiom 3 *(Separation): For all* $e \in \mathcal{E}$ *and* $z, z' \in Z^n$, *if there exists* $i \in N$ *such that* $z_i = z_i'$, *then* $z\boldsymbol{R}(e)z' \Leftrightarrow z_{-i}\boldsymbol{R}(e_{-i})z'_{-i}$.

Moreover, we want to limit the amount of information about individual preferences that is needed to compare two different allocations. More precisely, we require social preferences over two given allocations to depend only on the individual indifference curves at these mentioned allocations (e.g., Hansson 1973 and Pazner 1979).

Axiom 4 *(Independence): For all* $e = (W, q, R)$, $e' = (W, q, R') \in \mathcal{E}$ *and* $z, z' \in Z^n$, *if for all* $i \in N$ *and any bundle* $z'' \in Z$ *such that:*

$$z_i \sim_i^p z'' \Leftrightarrow z_i \sim_i^{p'} z''$$
$$z_i' \sim_i^p z'' \Leftrightarrow z_i' \sim_i^{p'} z'',$$

then $z\boldsymbol{R}(e)z' \Leftrightarrow z\boldsymbol{R}(e')z'$.

The following axiom is the two-dimensional version of the popular Pigou-Dalton transfer, which states that a mean-preserving progressive transfer reduces inequality.

Axiom 5 *(Transfer): For all* $e \in \mathcal{E}$ *and* $z, z' \in Z^n$*, if there exist* $j, k \in N$ *and* $\Delta \in \{\mathbb{R}^2_+ \setminus (0,0)\}$ *such that:*

$$z'_j - \Delta = z_j \gg z_k = z'_k + \Delta,$$

with $z_i = z'_i$ *for all* $i \neq j, k$*; then* $z\boldsymbol{R}(e)z'$.

It is a well-known fact that, in these settings, and under the presence of some other structural assumptions the transfer principle is incompatible with Pareto efficiency (e.g., Fleurbaey and Maniquet 2011). In order to avoid such impossibility we must introduce a weaker version of the transfer axiom that permits us to accommodate efficiency to equality of resources. The most natural way of executing such a task is to restrict transfers to individuals who have the same *ex post* preferences.

Axiom 6 *(Equal Preferences Transfer): For all* $e \in \mathcal{E}$ *and* $z, z' \in Z^n$*, if there exist* $j, k \in N$ *with* $R^p_j = R^p_k$ *and* $\Delta \in \{\mathbb{R}^2_+ \setminus (0,0)\}$ *such that:*

$$z'_j - \Delta = z_j \succ^p_j z_k = z'_k + \Delta,$$

with $z_i = z'_i$ *for all* $i \neq j, k$*; then* $z\boldsymbol{R}(e)z'$.

This axiom states that any transfer is welfare enhancing as long as the individual who receives it is still worse-off than the individual who pays the transfer, provided both have the same preferences. From an ethical point of view, individuals are generally considered to be responsible for their preferences, so the equal preferences transfer axiom favours the principle of compensation, which states that to reduce differences not due to preferences increases welfare. We can also strengthen the axiom by considering that any transfer maximises welfare whenever the inequality between two individuals who have the same preferences is reduced, no matter how large the difference between those individuals' losses and gains is.

Axiom 7 *(Equal Preferences Priority): For all* $e \in \mathcal{E}$ *and* $z, z' \in Z^n$*, if there exist* $j, k \in N$ *with* $R^p_j = R^p_k$ *such that:*

$$z'_j \succ^p_j z_j \succ^p_j z_k \succ^p_k z'_k,$$

with $z_i = z'_i$ *for all* $i \neq j, k$*; then* $z\boldsymbol{P}(e)z'$.

There are plenty of results in the literature that prove that this infinite aversion to inequality axiom is obtained whenever a limited measure of inequality is combined with Pareto efficiency and independence assumptions (e.g., Fleurbaey and Maniquet 2011).

The problem of these two principles is that they do not permit us to define welfare improving transfers when individuals differ in their preferences. Fleurbaey and Maniquet (2011) recommend to use the set of all the bundles that are proportional to the social endowment of goods. Here, we consider a path that entails bundles that are proportional to a given reference bundle.

Axiom 8 *(Path-a Transfer): For all $e \in \mathcal{E}$, $z, z' \in Z^n$ and a given bundle $a \in \mathbb{R}^2_{++}$, if there exist $j, k \in N$ with $z_j, z'_j, z_k, z'_k \in Pr(a)$, and $\Delta \in \mathbb{R}^2_{++}$ such that:*

$$z'_j - \Delta = z_j \gg z_k = z'_k + \Delta,$$

with $z_i = z'_i$ for all $i \neq j, k$; then $z\boldsymbol{R}(e)z'$.

It is important to stress that the use of the bundle a as the reference point, instead of the initial social endowment, is not costless. As Fleurbaey and Maniquet (2011) show, the use of an arbitrary reference can lead us to a conflict with the *equal-split transfer* axiom. This principle states that a transfer of positive quantities of each good from individual j to individual k moves us to a better allocation as long as, after the transfer, j still consumes more than the per capita share of the social endowment, while k would still consume less. However, in our model we are dealing with the problem of allocating a given amount of initial resources between two periods, and hence it is not clear how to define a proper per capita level of social endowment.

Finally, we present the equality of resources axiom that permits Fleurbaey (2005) to focus on the concept of equivalent endowment as the way of measuring social welfare. More precisely, we consider that a mean-preserving progressive transfer reduces inequality, provided that the agents involved in the transfer are not mismanaging their resources.

Axiom 9 *(Between-Maximisers Transfer): For all $e \in \mathcal{E}$ and $z, z' \in Z^n$, if there exist $j, k \in N$ with $z_j, z'_j \in \overline{Z}_j(\overline{w}, q)$ and $z_k, z'_k \in \overline{Z}_k(\overline{w}, q)$, and for some $\delta \in \mathbb{R}_{++}$ such that:*

$$qz'_j - \delta = qz_j > qz_k = qz'_k + \delta,$$

with $z_i = z'_i$ for all $i \neq j, k$; then $z\boldsymbol{R}(e)z'$.

Notice that this last axiom is a restricted view of the principle of reward, as it suggests that two individuals who are maximising their own preferences should be treated neutrally, and hence they should receive the same amount of resources. Therefore, our array of axioms prioritise mainly the principle of compensation over the reward criterion.

3 Social preferences

In this section we proceed to derive the social rankings that satisfy some of the axioms that we have just described. We are going to consider two possible scenarios. In the first subsection we are analysing the incompatibilities that arise among the different fairness axioms. Next, we are going to evaluate the implications of the resultant social ordering that is grounded on the traditional approach to the compensation problem. In the second subsection we are going to consider a more natural framework for the forgiveness problem. Prices are understood as the rate at which initial monetary resources can be moved to the second period, and hence they would remain constant throughout the whole analysis.

3.1 Social orderings and fairness requirements

Let us start this subsection by showing that all the properties that we have presented in the previous section cannot be satisfied at the same time, something that is due to the fact that the axiom that defines the concept of equivalent endowment clashes with the other fairness requirements.

Proposition 1 *No social ordering satisfies weak Pareto, transfer and between-maximisers transfer.*

As we have already stated, this is a typical result that forces us to adopt a restricted version of the transfer axiom, such as the path-a transfer. However, we can also show that to introduce such a restriction does not solve the conflict that exists with the between-maximisers transfer.

Proposition 2 *No social ordering satisfies weak Pareto, path-a transfer and between-maximisers transfer.*

Given these compatibility problems we propose the following methodology to rank allocations:

Theorem 1 *If social preferences satisfy forgiveness, weak Pareto, separation, independence, equal preferences transfer and path-a transfer, then for any economy $e \in \mathcal{E}$ and allocations $z, z' \in Z^n$ we have that:*

$$\min_i \widehat{z}_i(a) \gg \min_i \widehat{z}'_i(a) \Rightarrow z\boldsymbol{P}^a(e)z'.$$

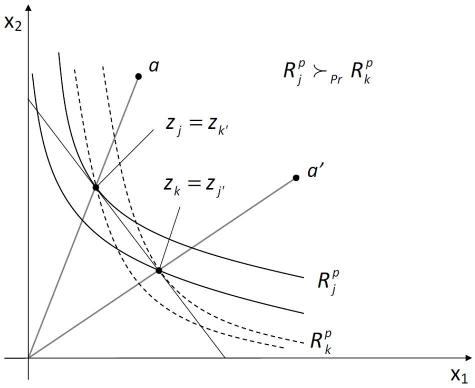


Figure 2: Remark 1

Therefore, between two different allocations, the social ordering ranks first the one in which the smallest proportional-equivalent bundle is larger. Let us denote by $\mathbf{R}^a(e)$ such a social ordering function. Notice that the final ranking clearly depends on the path-a that society picks. The choice of such a path implicity defines the degree of concern for forgiveness. The higher the slope of the path-a, the higher the concern for individuals who present a higher level of prudence. Such a result is due to the single-crossing property.

Let us explain the intuition of this outcome with the example depicted in Figure 2. Let us assume an economy with individuals $j, j', k, k' \in N$, where $R_j^p = R_{j'}^p$ and $R_k^p = R_{k'}^p$. Moreover, individual j is considered to be more prudent than individual k, that is $R_j^p \succ_{Pr} R_k^p$. Let us also assume that individuals j' and k' make their decisions using the wrong preferences, and hence afterwards they regret their choices. If society picks path-a we have that the worst-off individual is the prudent agent that regrets her previous choice, j'. Interestingly enough, the other individual who has made a mistake, k', is exactly equal-off than the prudent agent that does not mismanage her initial endowment. On the contrary, if society selects path-a' we get the opposite result. The worst-off individual would be the less prudent agent who has made a mistake, k', and society would consider that j' and k would be in an proportional-equivalent situation.

Admittedly, this is a quite odd result which points out that the methodology that solves the compensation problem does not fit in properly with the logic behind the fresh start ideal. Such difficulties arise because we are allowing prices to vary, something that is not natural on a fresh start environment, when we are mainly concerned about the fraction of monetary resources that every individual devotes to each period.

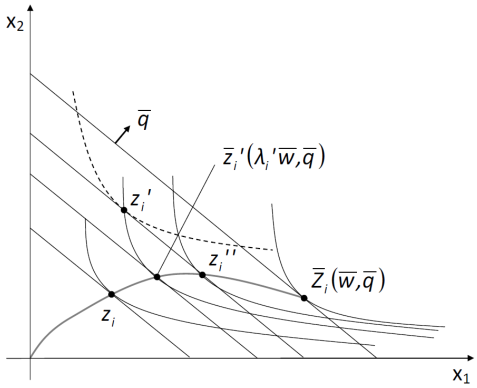


Figure 3: Path-$\overline{Z}_i(\overline{w}, \overline{q})$ graphical representation

3.2 Social preferences with a fixed reference price

In the present subsection we propose an alternative way of managing equality of resources that adapts better to the forgiveness principle. From now on we are going to consider that bundles are the fractions in which the initial endowment is split between the two periods. Let us define then a fixed price vector $\overline{q} = (1, \overline{q}_2) \in \mathbb{R}^2_{++}$, where $\overline{q}_2$ can be understood as the interest rate at which money can be lent in the initial period.

In order to bring the compensation and the forgiveness approaches together, it might sound attractive to define the path-a with the price vector $\overline{q}$, which actually defines the individual's budget set. But, as we have already shown in Proposition 2, no social ordering satisfies both the path-a transfer and the between-maximisers transfer principles, even if the price vector is used as a reference path.

Therefore, to bring the two approaches together we must carefully select the social requirements society wants to satisfy. Fresh starts are closely related to the idea of equivalent endowments, so in order to compare individuals' situations we should focus on the between-maximisers transfer axiom. As we can observe in Figure 3, the path defined by subset $\overline{Z}_i(\overline{w}, \overline{q})$ does not need to be monotone. In a scenario with a fixed price, if two individuals with the same proportional-income are equal in terms of resources, such a parameter implicitly defines the concept of equivalent endowment. We can now introduce a new way of ranking allocations that is grounded on both the fairness and the forgiveness principles.

Theorem 2 *If social preferences satisfy forgiveness, weak Pareto, separation, independence, equal preferences transfer and between-maximisers transfer, then for any economy $e \in \mathcal{E}$ and allocations $z, z' \in Z^n$ we have that:*

$$\min_i \lambda_i > \min_i \lambda'_i \Rightarrow z\boldsymbol{P}^m(e)z'.$$

Let us denote by $\mathbf{R}^m(e)$ such a social ordering function. Let us remark that the result obtained in Theorem 2 hinges crucially on the fact that prices are fixed, and so does Fleurbaey's (2005) solution. If that were the case, it would be possible to find two allocations $z, z' \in Z^n$ and two prices $\overline{q}, \overline{q}' \in \mathbb{R}^2_{++}$ such that $x\mathbf{R}^m(e)x'\mathbf{R}^m(e')x$. Moreover, as Fleurbaey and Maniquet (2011) show, to allow prices to vary may lead us to a conflict between Pareto efficiency and separation.

Table 1 recalls the various properties satisfied by the two social ordering functions obtained in this paper. The social orderings can also be related to previous solutions to the compensation problem in different environments. Let us focus on the model of private good production with unequal skills. Two of the social orderings proposed by these authors are the s_{min}-Equivalent Leximin ($\mathbf{R}^{s_{min}lex}$) and the $\widetilde{\ell}$-Egalitarian Walrasian Leximin ($\mathbf{R}^{\widetilde{\ell}EW}$).[6] When individuals are assumed to be equally skilled the $\mathbf{R}^{s_{min}lex}$ is in line with $\mathbf{R}^m(e)$. In that case all agents would have the same productivity, and society should just have to equalise equivalent endowments across the population. It is, however, much more complicated to relate $\mathbf{R}^a(e)$ to the $\mathbf{R}^{\widetilde{\ell}EW}$ criterion. The aspect that they have in common is that the final redistribution drastically depends on the reference point. Social ordering $\mathbf{R}^{\widetilde{\ell}EW}$ anchors social redistributions to a specific labour time choice $\widetilde{\ell} \in [0, 1]$. For $\widetilde{\ell}$ sufficiently low, the worst-off agents would be the high-skilled agents. Likewise, if the reference bundle a of our model is sufficiently biased to present consumption, the redistribution policy benefits more the less prudent agents. Similar conclusions can be obtained in relation to a model of redistribution of divisible goods.

After having analysed the fairest way of ranking alternative social alternatives when there exists a social concern for those who have mismanaged their initial resources, the next step would be to design how the fresh start policy can actually be implemented. This is not a trivial issue because the individual's regret arises after the level of consumption in period 1 has been decided. Therefore, in such a scenario we are allowed to make transfers only with the remaining resources, which are the second-period levels of

[6] E.g., Kolm (1996), Fleurbaey and Maniquet (1996, 2005), and Maniquet (1998).

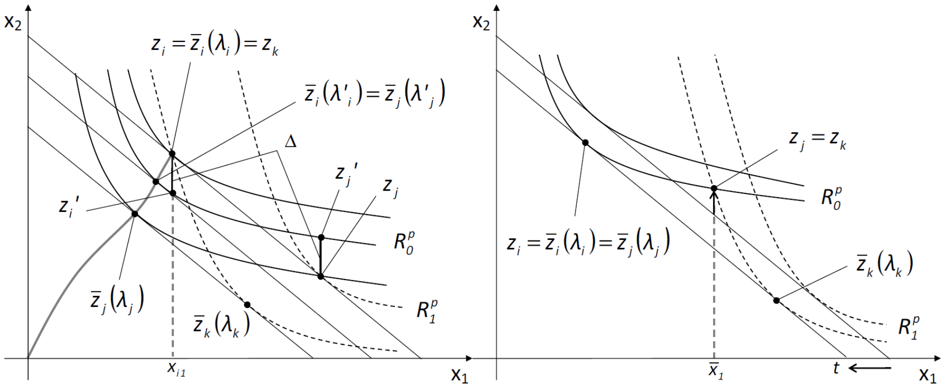
	$\mathbf{R}^a(e)$	$\mathbf{R}^m(e)$
Weak Pareto	Yes	Yes
Separation	Yes	Yes
Independence	Yes	Yes
Transfer	No	No
Equal Preferences Transfer	Yes	Yes
Path-a Transfer	Yes	No
Between-Maximisers Transfer	No	Yes

Table 1: Properties satisfied by the social ordering functions

consumption. For instance, let us assume an allocation $z \in Z^n$ with just two individuals $\{i, j\}$ who have the same *ex post* preferences $R_0^p \in \mathcal{R}$. This situation is given in Figure 4a. If j chooses her initial consumption with the wrong preferences, we have that there is a utility loss measured by the difference $\lambda_j < \lambda_i$. The only possible way of compensating that individual is to make a transfer $\Delta = (0, \delta) > 0$ such that $\lambda'_j = \lambda'_i$. This new allocation $z' \in Z^n$ would imply the same utility loss for both agents.

However, if the planner knows that one of the two agents is going to become more prudent in the future, a different solution to the problem would be to force, somehow, all individuals to consume x_{i1} in the first period. In that case the social welfare would be maximum. Nevertheless, if we introduce an agent k with preferences $R_1^p \in \mathcal{R}$ such that $R_0^p \succ_{Pr} R_1^p$, the former policy would inflict a utility loss for k if the planner cannot distinguish between individuals. That is, the design of the policy would become much more complicated with a larger variety of *ex post* preferences.

In such a complex scenario, Fleurbaey (2005) presents a very intuitive way of providing regretful individuals with a fresh start. First, the planner should try to limit the maximum level of consumption in the first period up to $\overline{x}_1$, for instance (see Figure 4b). Notice that compulsory social security contributions can be understood as a way of limiting the expenditure on the first period. Such limitations can be understood as a way of minimising the future regret, and hence as a way of maximising intertemporal freedom. Second, the social compensation should be complemented with monetary transfers in the second period, taking into account that all individuals who are less prudent would have the possibility of applying for those subsidies, regardless of whether they regret their previous choice or not. Such transfers can be implemented if, for instance, in the first period there is a fixed tax $t \in \mathbb{R}_+$ that everybody must pay. In this particular example the final value



(a) Making *ex post* transfers (b) Designing the fresh start policy

Figure 4: Dealing with fresh starts

of λ would be the same for all individuals, and hence social welfare would be maximised.

4 Concluding remarks

Forgiveness is an ethical ideal that advocates giving a fresh start to those agents who have mismanaged their initial resources and regret the choices they have made in the past. After an interesting and intense debate, Fleurbaey (2005) concludes that the only argument that can be put forward to not support such an ideal is that it might generate perverse incentives. In order to escape from that problem he proposes a scheme of taxes and subsidies that is incentive compatible. More precisely, he recommends to make the smallest equivalent endowment in society as large as possible. However, Fleurbaey (2005) does not provide his solution with any axiomatic justification whatsoever.

In this paper we have extended the model of forgiveness to formally deal with the problem of equality of resources. First, we have confirmed that the usual conflict between Pareto and transfer axioms also arises in a specific model of forgiveness. Additionally, we have also proved that the standard procedure to solve such a conflict is not compatible with the concept of equivalent endowment, which is the most common way of making interpersonal comparisons in a model of forgiveness.

Second, we have axiomatically derived two social orderings that aim to shape the problem of fairness and responsibility with the ideal of forgiveness.

On the one hand, our first ranking is independent of the actual prices, but it clashes with the axiom that defines the equivalent endowment and the laissez-faire ideal. On the other hand, our second ordering leads us to the solution proposed by Fleurbaey (2005), although it crucially hinges on the existence of a fixed reference price. Otherwise, the ranking would not be consistent, and clashes between basic axioms would arise.

Third, we have related our two social orderings to those proposed to other particular environments such as the distribution of divisible goods, or the private good production model with unequal skills.

Finally, we have briefly sketched the practical implementation of the forgiveness ideal. Fleurbaey (2005) recommends that initial restrictions should be accompanied by subsequent subsidies. For example, we can think of a pension system in which initial compulsory social contributions at working age are followed by monetary transfers during retirement. Similar fresh start policies can be designed for alternative goods such as education or health.

To summarize, the present paper gives support to the use of the equivalent endowment by means of providing it with an ethical foundation, and hence it can be understood as an axiomatic solution to deal with the compensation problem when society is also concerned about the forgiveness principle.

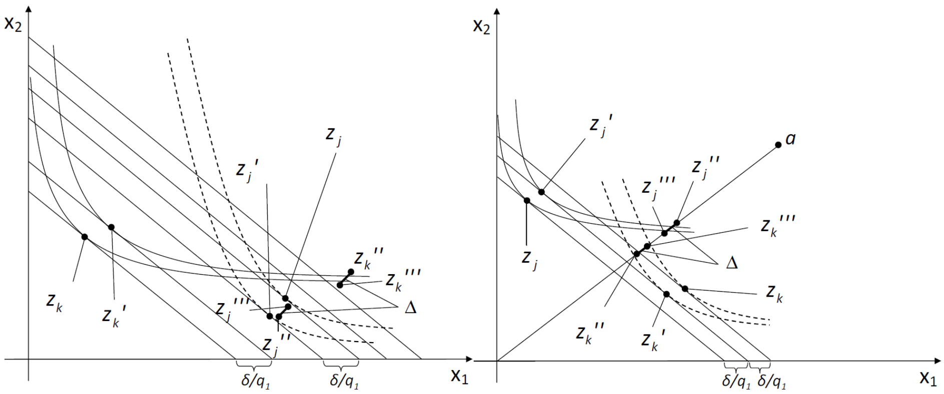
A Appendix

A.1 Proof of Proposition 1

Proof. Let us consider two allocations $z, z' \in Z^n$, and two individuals $j, k \in N$ with bundles such as those depicted in Figure 5a. According to the *between-maximisers transfer* principle we have that $z'\mathbf{R}(e)z$. Let us take now a transfer $\Delta \in \mathbb{R}^2_{++}$ and two additional allocations $z'', z''' \in Z^n$ as depicted in the same figure. Using the *transfer* axiom it must be the case that $z'''\mathbf{R}(e)z''$. According to *weak Pareto* we have both $z\mathbf{P}(e)z'''$ and $z''\mathbf{P}(e)z'$. Finally, by *transitivity* we obtain that $z\mathbf{P}(e)z'$, which contradicts the initial relation. ■

A.2 Proof of Proposition 2

Proof. Let us consider two allocations $z, z' \in Z^n$, and two individuals $j, k \in N$ with bundles such as those depicted in Figure 5b. According to the *between-maximisers transfer* principle we have that $z'\mathbf{R}(e)z$. Let us take now a transfer $\Delta \in \mathbb{R}^2_{++}$ and two additional allocations $z'', z''' \in Z^n$ as



(a) Proposition 1 (b) Proposition 2

Figure 5: Proofs of Proposition 1 and 2

depicted in the same figure. Using the *path-a transfer* axiom it must be the case that $z'''\mathbf{R}(e)z''$. According to *weak Pareto* we have both $z\mathbf{P}(e)z'''$ and $z''\mathbf{P}(e)z'$. Finally, by *transitivity* we obtain that $z\mathbf{P}(e)z'$, which contradicts the initial relation. ■

A.3 Proof of Theorem 1

In order to prove this theorem we first need to introduce and prove the following lemma:

Lemma 1 *If social preferences satisfy weak Pareto, independence and equal preferences transfer, then they satisfy equal preferences priority.*

Proof. (Lemma 1) This proof is derived from the results in Fleurbaey and Maniquet (2006). Let us take two allocations $z, z' \in Z^n$ and individuals $j, k \in N$ with $R_j^p = R_k^p = R^p \in \mathcal{R}$ such that

$$z'_k \succ^p z_k \succ^p z_j \succ^p z'_j.$$

By *independence* we can modify all individuals' indifference curves except those located at the reference bundles $I(z_j), I(z'_j), I(z_k), I(z'_k)$. Let us define the indifference curves $I'(x)$ and $I''(x)$ as follows:

$$\left.\begin{array}{l} \lim\limits_{x\to(\infty,0)} I'(x) = I(z_k) \\ \lim\limits_{x\to(0,\infty)} I'(x) = I(z'_k) \end{array}\right| \begin{array}{l} \lim\limits_{x\to(\infty,0)} I''(x) = I(z_j) \\ \lim\limits_{x\to(0,\infty)} I''(x) = I(z'_j). \end{array}$$

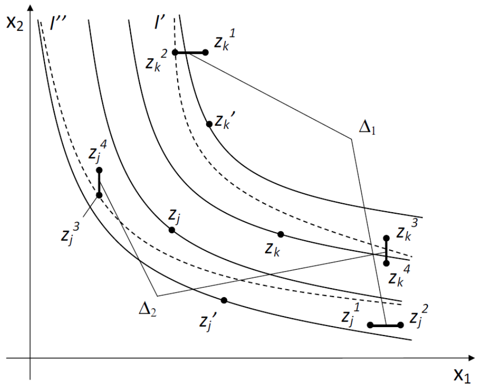


Figure 6: Proof of Lemma 1

Such indifference curves (dashed lines) are situated between the initial ones (solid lines) as we can observe in Figure 6. By construction we can find allocations $z^1, z^2, z^3, z^4 \in Z^n$ such that $z_k^2 = z_k^1 - \Delta_1$; $z_k^4 = z_k^3 - \Delta_2$; $z_j^2 = z_j^1 + \Delta_1$; $z_j^4 = z_j^3 + \Delta_2$, where $\Delta_1 = (\varepsilon_1, 0) > 0$, $\Delta_2 = (0, \varepsilon_2) > 0$, and:

$$z_k^1 \succ^p z_k' \succ^p z_k^3 \succ^p z_k^2 \succ^p z_k \succ^p z_k^4 \succ^p z_j \succ^p z_j^4 \succ^p z_j^3 \succ^p z_j^2 \succ^p z_j^1 \succ^p z_j',$$

with $z_i^1 = z_i^2 = z_i^3 = z_i^4$ for all $i \neq j, k \in N$. Using *equal preferences transfer* we have that both $z^2\mathbf{R}(e)z^1$ and $z^4\mathbf{R}(e)z^3$. Moreover, by *weak Pareto* we obtain that $z\mathbf{P}(e)z^4$, $z^3\mathbf{P}(e)z^2$ and $z^1\mathbf{P}(e)z'$. Finally, by *transitivity* it must be the case that $z\mathbf{P}(e)z'$. ■

Now we can proceed to prove Theorem 1.

Proof. (Theorem 1) Let us consider two individuals $j, k \in N$ and two allocations $z, z' \in Z^n$ such that, $\widehat{z}_j'(a) \ll \widehat{z}_j(a) \ll \widehat{z}_k(a) \ll \widehat{z}_k'(a)$, and $z_i = z_i'$ for all $i \neq j, k$. When the relations are different to the one proposed here, the proof is either immediate or analogous. By *forgiveness* we must focus on the individuals' *ex post* preferences, that is $R^p \in \mathcal{D}$. We are going to prove first that it must be the case that $z\mathbf{P}(e)z'$. Opposite to the desired result, let us assume that $z'\mathbf{R}(e)z$.

• Case i: Let individuals $j, k, \in N$ share the same preferences, that is $R_j^p = R_k^p = R^p \in \mathcal{R}$. Let us define an allocation $z'' \in Z^n$ such that:

$$z_k' \succ^p z_j \succ^p z_k \succ^p z_k'' \succ^p z_j'' \succ^p z_j',$$

and moreover $z_i'' = z_i$ for all $i \neq j, k$. By Lemma 1 we know that social preferences R^p satisfy *equal preferences priority*, and using such a property we obtain that $z''\mathbf{R}(e)z'$. Moreover, following *weak Pareto* we have that $z\mathbf{P}(e)z''$. Finally, by *transitivity* $z\mathbf{P}(e)z'$, which yields the desired contradiction (see Figure 7a).

• Case *ii*: Let us consider now that individuals $j, k, \in N$ have different preferences. Let us take two additional individuals $b, c \in N$ with $R_b^p = R_j^p = R_0^p \in \mathcal{R}$ and $R_c^p = R_k^p = R_1^p \in \mathcal{R}$. Let us assume that there exist $z_b', z_b'', z_b''', z_c', z_c'', z_c''' \in Pr(A)$ and $\Delta \in \mathbb{R}^2_{++}$ such that:

$$\begin{gathered} z_c'' \gg z_c''' \gg z_c' = z_c'' - \Delta \gg z_b' = z_b'' + \Delta \gg z_b'' \gg z_b''' \\ z_b' \succ_0^p z_b'' \succ_0^p z_b''' \succ_0^p z_j'' \succ_0^p z_j' \\ z_k \succ_1^p z_k'' \succ_1^p z_c'' \succ_1^p z_c''' \succ_1^p z_c', \end{gathered}$$

and moreover $z_i = z_i' = z_i''$ for all $i \neq j, k, b, c$ (see Figure 7b). According to the initial assumptions, if we apply the *separation* axiom we obtain that $(z_j', z_k', z_b', z_c')\mathbf{R}(e)(z_j, z_k, z_b', z_c')$. By *equal preferences priority* we have both $(z_j', z_k'', z_b', z_c''')\mathbf{P}(e)(z_j', z_k', z_b', z_c')$, and $(z_j'', z_k'', z_b''', z_c''')\mathbf{P}(e)(z_j', z_k'', z_b', z_c''')$. Using *weak Pareto* we have that $(z_j, z_k, z_b'', z_c'')\mathbf{P}(e)(z_j'', z_k'', z_b''', z_c''')$. Finally, by *transitivity* we have that $(z_j, z_k, z_b'', z_c'')\mathbf{P}(e)(z_j, z_k, z_b', z_c')$. However, if we apply *separation* and *path-a transfer* axioms, it is straightforward to obtain that $(z_j, z_k, z_b', z_c')\mathbf{R}(e)(z_j, z_k, z_b'', z_c'')$, which yields the desired contradiction.

Finally, following the line of reasoning used by Valletta (2009), we can design a series of allocations that would allow us to show that whenever there exist $z, z' \in Z^n$ such that $\min_i \widehat{z}_i(a) \gg \min_i \widehat{z}_i'(a) \Rightarrow z\mathbf{P}(e)z'$. Let us take now two allocations $z, z' \in Z^n$ such that $\min_i \widehat{z}_i(a) \gg \min_i \widehat{z}_i'(a)$. Because of the monotonicity of preferences and the strict monotonicity of path-a, one can find two allocations $x, x' \in Z^n$ such that $\widehat{z}_i(a) \gg \widehat{x}_i(a)$ and $\widehat{x}_i'(a) \gg \widehat{z}_i'(a)$ for all $i \in N$. Moreover, there exists i_0 such that for all $i \neq i_0$:

$$\widehat{x}_i'(a) \gg \widehat{x}_i(a) \gg \widehat{x}_{i_0}(a) \gg \widehat{x}_{i_0}'(a).$$

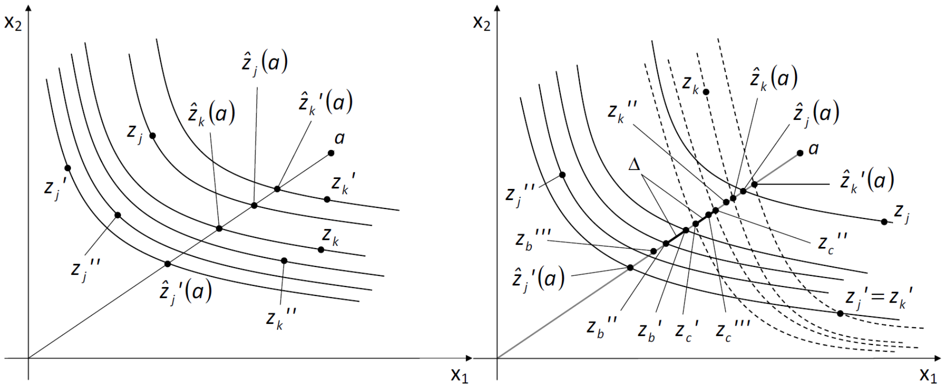
Let $Q = N \setminus \{i_0\}$ and let us assume a sequence of allocations $(x^q)_{1 \leq q \leq |Q|+1}$ such that

$$\begin{aligned} \widehat{x}_i^q(a) = \widehat{x}_i'(a), &\quad \forall i \in Q: \ i \geq q \\ \widehat{x}_i^q(a) = \widehat{x}_i(a), &\quad \forall i \in Q: \ i < q, \end{aligned}$$

while

$$\widehat{x}_{i_0}(a) = \widehat{x}_{i_0}^{|Q|+1}(a) \gg \widehat{x}_{i_0}^{|Q|}(a) \gg \ldots \gg \widehat{x}_{i_0}^1(a) = \widehat{x}_{i_0}'(a).$$

This implies that $\widehat{x}_{i_0}^q(a) \ll \widehat{x}_{i_0}^{q+1}(a) \ll \widehat{x}_q^{q+1}(a) \ll \widehat{x}_q^q(a)$, while for all $j \neq q, i_0$, we have that $\widehat{x}_j^q(a) = \widehat{x}_j^{q+1}(a)$. As we have previously proved, it must be the case that $x^{q+1}\mathbf{P}(e)x^q$, $\forall q \in Q$. According to the initial assumptions, by *weak Pareto* we have that $z\mathbf{P}(e)x^{|Q|+1}$ and $x^1\mathbf{P}(e)z'$. Finally, by *transitivity* we have that $z\mathbf{P}(e)z'$. ■



(a) Case i (b) Case ii

Figure 7: Proof of Theorem 1

A.4 Proof of Theorem 2

Proof. (Theorem 2) Let us consider two allocations $z, z' \in Z^n$ and two individuals $j, k \in N$ such that, without loss of generality, $\lambda'_j < \lambda_k < \lambda_j < \lambda'_k$, and $z_i = z'_i$ for all $i \neq j, k$. By *forgiveness* we must focus on the individuals' *ex post* preferences, that is $R^p \in \mathcal{D}$. Opposite to the desired result, let us assume that $z'\mathbf{R}(e)z$.

• Case i: Let individuals $j, k, \in N$ have the same preferences, that is $R^p_j = R^p_k = R^p \in \mathcal{R}$. Then:

$$\lambda'_j < \lambda_k < \lambda_j < \lambda'_k \Leftrightarrow z'_k \succ^p z_j \succ^p z_k \succ^p z'_j.$$

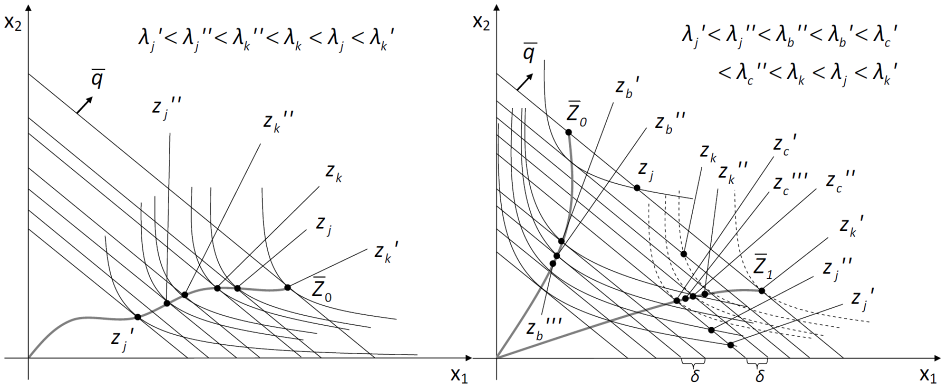
Next, the line of reasoning used in the proof of Theorem 1 can be applied to obtain the desired contradiction (see Figure 8a).

• Case ii: Let us consider now that individuals $j, k, \in N$ have different preferences. Let us take two additional individuals $b, c \in N$ with $R^p_b = R^p_j = R^p_0 \in \mathcal{R}$, and $R^p_c = R^p_k = R^p_1 \in \mathcal{R}$ such that:

$$\begin{gathered} z_j \succ^p_0 z'_b \succ^p_0 z''_b \succ^p_0 z'''_b \succ^p_0 z''_j \succ^p_0 z'_j \\ z'_k \succ^p_1 z_k \succ^p_1 z''_k \succ^p_1 z''_c \succ^p_1 z'''_c \succ^p_1 z'_c, \end{gathered}$$

where $\{z'_b, z''_b, z'''_b\} \in \overline{Z}_0(\overline{w}, \overline{q})$, and $\{z'_c, z''_c, z'''_c\} \in \overline{Z}_1(\overline{w}, \overline{q})$. Moreover, let us assume that:

$$pz''_c - \delta = pz'_c > pz'_b = pz''_b + \delta \Rightarrow \lambda''_c > \lambda'_c > \lambda'_b > \lambda''_b,$$



(a) Case i (b) Case ii

Figure 8: Proof of Theorem 2

with $\delta > 0$ and $z_i = z'_i = z''_i$ for all $i \neq j, k$ (see Figure 8b). According to the initial assumptions and the *separation* axiom we obtain that $(z'_j, z'_k, z'_b, z'_c)\mathbf{R}(e)(z_j, z_k, z'_b, z'_c)$. Applying *equal preferences priority* twice we can obtain both that $(z'_j, z''_k, z'_b, z'''_c)\mathbf{P}(e)(z'_j, z'_k, z'_b, z'_c)$, and that $(z''_j, z''_k, z'''_b, z'''_c)\mathbf{P}(e)(z'_j, z''_k, z'_b, z'''_c)$. Additionally, *weak Pareto* implies that $(z_j, z_k, z''_b, z''_c)\mathbf{P}(e)(z''_j, z''_k, z''_b, z''_c)$. Finally, by *transitivity* we have that $(z_j, z_k, z''_b, z''_c)\mathbf{P}(e)(z_j, z_k, z'_b, z'_c)$. However, if we apply *separation* and the *between-maximisers transfer*, it is straightforward to check that $(z_j, z_k, z'_b, z'_c)\mathbf{R}(e)(z_j, z_k, z''_b, z''_c)$, which yields the desired contradiction.

Again, the result can be extended to show that whenever there exist $z, z' \in Z^n$ such that, $\min_i \lambda_i > \min_i \lambda'_i \Rightarrow z\mathbf{P}(e)z'$. ■

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